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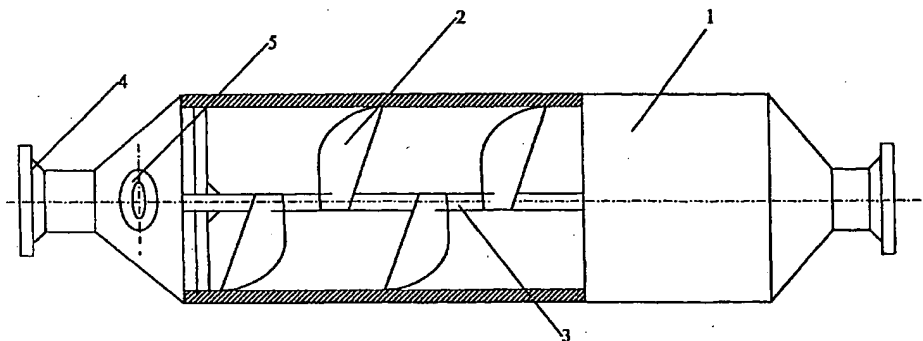
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MIXING DEVICE



(57) Abstract: A mixing device that includes a body (1), along the axis of which a rod (3) is fixed, while in the lower part of the body (1) an orifice (6) is fixed for the discharge of the obtained mixture. On the top of the body (1) orifices for the charge of the mixed components, while segmented blades 2 are fixed to the rod (3) along the length of the rod (3), at an angle to its axis and rotated at an angle to each other, so that the rod (3) is fixed immovably to the body.

Mixing Device

Field of Technique

The invention is concerned with an apparatus for the intense mixing
5 of hard, liquid, gaseous materials until a homogenous mixture is obtained.

Prior art

Different types of apparatuses for mixing are known. Depending on
the physical condition of the components these apparatuses are used for:
10 mixing of gasses, mixing in liquid environment, mixing in solid environment.
Usually the mixing in a liquid environment is performed mechanically and the
working elements have different shapes. In particular cases the mixing can be
accomplished by the use of gasses, for example, air (pneumatic mixing), or
regular pumps. The usage of pneumatic mixing or pumps has limited
15 application because of the greater power consumption. During the mechanical
mixing the mixer consists of a lease, which rotates directly or through a reductor
by an electric motor. Depending on the shape of the working elements, they are
classified as follows: blade type, propeller type, turbine type and special type.

For example, a known mixer of blade type normally includes a body,
20 in which a shaft is located, driven directly or through a reduction gear by an
electric motor. One or more blades are fixed at the end of the shaft.

A shortcoming of the conventional mixing devices is the necessity for
the driving of the main working element of the mixing devices, which results in
increased power consumption and the effectiveness of the process depends on
25 dimensions of the mixing vessels and the duration of the process, which occurs
periodically.

Summary of the Invention

The aim of the current invention is to create a mixing device which
30 insures effective stirring and mixing of components at reduced power

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consumption and reduced duration of the process, taking place in vessels with considerably reduced dimensions in an uninterrupted manner.

The aim is achieved by creating a mixing device, which includes a body along the axis, on which a rod is located and an orifice for the discharge of the obtained mixture is fixed in the lower part of the body. The mixing device is characterized in that the rod along its length has segmented blades located at an angle to the axis of the rod and rotated at an angle from each other so that the rod is firmly fixed to the body.

In one variant of accomplishment of the mixing device the body has cylindrical shape.

In another variant of accomplishment the blades have a circular segment profile.

It is suitable for both ends of the cylindrical body to be coned, so that at least one orifice is fixed in the upper conic part, at an angle to the axis of the body which charges the second component.

It is suitable in this preferred variant of accomplishment the angle of allocation of the second orifice to be 45° .

The advantages of the mixing device, according to the invention lay in that it provides effective mixing of the components without the necessity of driving the blade rod so the expenditure of power for the accomplishment of the mixing process is considerably reduced. Moreover, the mixed components are charged continuously in the mixing device so that a continuous process of mixing is ensured, which allows a considerable reduction in the dimensions of the mixing device.

Description of attached drawings

Figure 1 is a schematic illustration in semi-section of the mixing device.

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Examples for particular realization

The mixing device consists of body 1, monolithic or assembled
5 construction. Basically, the body 1 can have various cross-sections. However
the preferred shape is cylindrical because it allows for the best allocation of the
remaining elements of the mixing device. The type of the material of the body 1
depends on the climatic conditions of exploitation of the mixing device and is
determined by the working pressure, the limitations of the height of the liquid
10 column and the source of compression so that it is no more than 0,25 MPa.

Segmented blades 2 are located in the working part of the cylindrical
body 1, at a certain angle α that is determined by the viscosity of the mixed
components. Each blade 2 is rotated to the former at an angle, which allows
screw-like movement and mixing of the components in one or a few revolutions
15 along the length of the working part of the cylindrical body 1.

Blades 2 have a circular segment profile and are fixed on the
cylindrical rod 3, fixed along the axis of the cylindrical body 1. The rod 3 is firmly
fixed to the body 1.

Both ends of the cylindrical body 1 can be coned. On the top of body
20 1 an orifice 4, which charges one of the components (for example, oil), is fixed.
Orifices 5 (one or more) are located in the cone part of the cylindrical body 1 at
an angle of 45° to its axis.

The mixing device functions as follows:

The oil is charged at the input of the cylindrical body 1 through the
25 orifice 4 and is mixed with the water and the overheated steam currents,
charged through the orifices 5 located in the cone part of the cylindrical body 1 at
an angle of 45° to its axis.

Because of the design of the blades 2 and their mutual position to
each other and to the rod 3 turbulization of the current is achieved which leads
30 to the intensification of the process of mixing of the participation compounds.

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The mixture of oil and water flows turbulently to the lower part of the mixing device along the channel formed by blades 2 and rod 3, from where the obtained mixture is discharged through orifice 6 at a high homogeneity of mixing.

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Patent Claims

1. A mixing device that includes a body (1), along the axis of which a rod (3) is fixed, while in the lower part of the body (1) an orifice is fixed for the discharge of the obtained mixture, characterized in that on the top of the body (1) orifices for the charge of the mixed components are mounted, while segmented blades 2 are fixed to the rod (3) along the length of the rod (3), at an angle to its axis and rotated at an angle to each other, so that the rod (3) is firmly fixed to the body.

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2. A mixing device, according to claim 1, characterized in that the body (1) has cylindrical shape.

3. A mixing device according to claim 2, characterized in that the blade (2) has a profile of a circular segment.

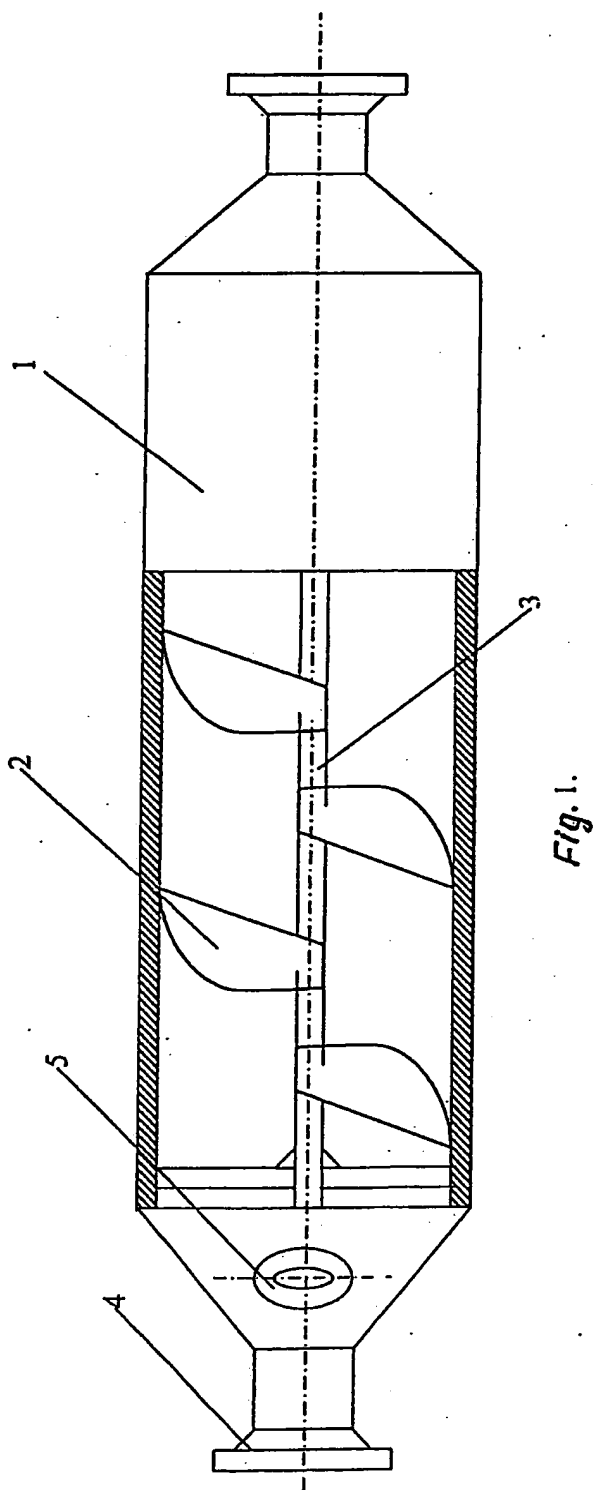
4. A mixing device according to claim 2 or 3, characterized in that both ends of the cylindrical body (1) are coned, so that in the top cone part of the body (1) a second orifice (5) is fixed, at an angle to the axis of the body (1) for the charge of the second component.

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5. A mixing device, according to claim 4, characterized in that the cone part of the body (1) has more than one orifice (5).

6. A mixing device, according to claim 4 or 5, characterized in that the angle of allocation of the second orifice (5) is 45° .

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International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01F5/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 743 250 A (FITZHUGH E ET AL) 3 July 1973 (1973-07-03) abstract; figures 1,4	1-6
X	US 4 072 296 A (DOOM LEWIS G) 7 February 1978 (1978-02-07) abstract; figure 1	1-3
X	US 4 008 072 A (KUHN MARTIN C ET AL) 15 February 1977 (1977-02-15) abstract; figure 2	1-3
A	US 4 826 089 A (PSALTOPOULOS EMMANUEL) 2 May 1989 (1989-05-02) the whole document	1-6
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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 4 123 178 A (SALZMAN RONALD N ET AL) 31 October 1978 (1978-10-31) the whole document</p>	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

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